

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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SERIAL NO.: 10/772,792	
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FOR: POLYMER COLLOID-CONTAINING INK-JET INKS FOR PRINTING ON NON-POROUS SUBSTRATES	
DOCKET NO.: 200316243-1	

APPELLANTS' APPEAL BRIEF UNDER 37 C.F.R. § 41.37

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
Mail Stop Appeal Brief – Patents

Sir:

Appellants submit this Appeal Brief in connection with their appeal from the final rejection of the Patent Office mailed December 9, 2009 in the above-identified application. A Notice of Appeal was filed on January 19, 2010, which was received by the Board of Appeals on January 19, 2010.

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I. REAL PARTY IN INTEREST

The real party in interest is Hewlett-Packard Development Company, LP, a limited partnership established under the laws of the State of Texas and having a principal place of business at 20555 S.H. 249 Houston, TX 77070, U.S.A. (hereinafter "HPDC"). HPDC is a Texas limited partnership and is a wholly-owned affiliate of Hewlett-Packard Company, a Delaware Corporation, headquartered in Palo Alto, CA. The general or managing partner of HPDC is HPQ Holdings, LLC.

II. RELATED APPEALS AND INTERFERENCES

Appellants and Appellants' legal representatives know of no other appeals or interferences that will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 12-16, 18, 23, 25-30, 32, 37, and 39-44 remain pending and have been rejected. Claims 1-11, 17, 19-22, 24, 31, 33-36, and 38 have been canceled. The claims on appeal in this application are claims 12-16, 18, 23, 25-30, 32, 37, and 39-44.

IV. STATUS OF AMENDMENTS

No amendments to the presently pending claims have been made since the Office Action mailed on December 9, 2009, by which the final rejection of the pending claims was made.

V. SUMMARY OF CLAIMED SUBJECT MATTER

12. (previously presented) A system for printing images (page 2, line 19), comprising:

a) an ink-jet ink (page 2, lines 19-20), including:

i) an aqueous liquid vehicle having at least one volatile co-solvent (page 2, lines 20-21), each volatile co-solvent present having a boiling point at or below about 285°C (page 2, lines 21-22), wherein the total amount of volatile co-solvent present in the ink-jet ink is from 5 wt% to 50 wt% (page 2, lines 22-23),

ii) acid-functionalized polymer colloid particulates dispersed in the liquid vehicle (page 2, lines 23-25), said acid-functionalized polymer colloid particulates including surface acid groups (page 12, lines 26-29), said surface acid groups provided by acid monomers copolymerized with other monomers to form the polymer colloid particulates (page 12, lines 30-32), said acid monomers being present at from 1 wt% to 15 wt% of total monomers used to form the polymer colloid particulates (page 13, lines 2-4), and

iii) polymer-encapsulated pigment colorants dispersed in the liquid vehicle (page 2, lines 23-25);

b) a thermal ink-jet printhead (page 16, lines 20-21) configured for printing ink-jet ink (page 2, lines 25-26);

c) a non-porous substrate configured for receiving the ink-jet ink upon printing with the ink-jet printhead (page 2, lines 26-28); and

d) a heating element configured for heating the image once it is printed on the non-porous substrate (page 14, 9-10).

13. (previously presented) A system as in claim 12, wherein the liquid vehicle further comprises a non-volatile co-solvent in an amount of from 0.1 wt% to 10 wt% (page 8, lines 3-4; page 6, lines 10-12, 3-9).

14. (previously presented) A system as in claim 12, wherein the liquid vehicle further comprises a non-volatile co-solvent in an amount of from 0.1 wt% to 2 wt% (page 8, lines 4-5; page 6, lines 10-12, 3-9).

26. (previously presented) A method of printing an image with good rub resistance (page 2, lines 29-30), comprising:

a) ink-jetting from a thermal ink-jet printhead (page 16, lines 20-21) an ink-jet ink onto a non-porous substrate to form the image (page 2, line 30), said ink-jet ink including:

i) an aqueous liquid vehicle having at least one volatile co-solvent (page 2, lines 20-21), each volatile co-solvent present having a boiling point at or below about 285°C (page 2, lines 21-22), wherein the total amount of volatile co-solvent present in the ink-jet ink is from 5 wt% to 50 wt% (page 2, lines 22-23);

ii) acid-functionalized polymer colloid particulates dispersed in the liquid vehicle (page 2, lines 23-25); said acid-functionalized polymer colloid particulates including surface acid groups (page 12, lines 26-29), said surface acid groups provided by acid monomers copolymerized with other monomers to form the polymer colloid particulates (page 12, lines 30-32), said acid monomers being

present at from 1 wt% to 15 wt% of total monomers used to form the polymer colloid particulates (page 13, lines 2-4), and

iii) polymer-encapsulated pigment colorants dispersed in the liquid vehicle (page 2, lines 23-25); and

b) heating the image once it is printed on the non-porous substrate (page 8, lines 9-10).

27. (previously presented) A method as in claim 26, wherein the liquid vehicle further comprises a non-volatile co-solvent in an amount of from 0.1 wt% to 10 wt% (page 8, lines 3-4; page 6, lines 10-12, 3-9).

28. (previously presented) A method as in claim 26, wherein the liquid vehicle further comprises a non-volatile co-solvent in an amount of from 0.1 wt% to 2 wt% (page 8, lines 4-5; page 6, lines 10-12, 3-9).

41. (previously presented) A system as in claim 12, wherein the acid-functionalized polymer colloid particulates have a density of 0.9 g/cm³ to 1.1 g/cm³ (page 14, lines 3-4).

42. (previously presented) A system as in claim 12, wherein the acid-functionalized polymer colloid particulates have a surface dielectric constant below 2.8 (page 14, lines 4-5).

43. (previously presented) A method as in claim 26, wherein the acid-functionalized polymer colloid particulates have a density of 0.9 g/cm^3 to 1.1 g/cm^3 (page 14, lines 3-4).

44. (previously presented) A method as in claim 26, wherein the acid-functionalized polymer colloid particulates have a surface dielectric constant below 2.8 (page 14, lines 4-5).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The issues presented for review are:

- a. whether claims 13-14 and 27-28 are unpatentable under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement;
- b. whether claims 12-13, 15-16, 23, 25-27, 29-30, 37, and 39-44 are unpatentable under 35 U.S.C. § 102(e) as being anticipated by U.S. Publication No. 2004/0063807 to Wang et al. (hereinafter “Wang”) in view of evidence given in Hawley’s Condensed Chemical Dictionary (hereinafter “*Hawley’s*”);
- c. whether claims 12-16, 23, 25-30, 37, and 39-44 are unpatentable under 35 U.S.C. § 103(a) as being obvious over Wang in view of evidence given in *Hawley’s*;
- d. whether claims 12-16, 18, 23, 25-30, 32, 37, and 39-44 are unpatentable under 35 U.S.C. § 103(a) as being obvious over Wang in view of U.S. Publication No. 2004/0229974 to Miyabayashi (hereinafter “Miyabayashi”);
- e. whether claims 12-15, 18, 23, 25-29, 32, 37, and 39-44 are unpatentable under 35 U.S.C. § 103(a) as being obvious over U.S. Publication No. 2003/0069329 of Kubota et al. (hereinafter “Kubota”) in view of *Hawley’s* and either U.S. Patent No. 6,536,890 to Kato et al. (hereinafter “Kato”) or U.S. Patent No. 5,207,824 to Moffatt et al. (hereinafter “Moffatt”); and
- f. whether claims 12-15, 18, 23, 25-29, 32, 37, and 39-44 are unpatentable under 35 U.S.C. § 103(a) as being obvious over Kubota in view of *Hawley’s* and either Kato and Moffatt and further in view of U.S. Patent Publication No. 2004/0055508 of Miyamoto et al. (hereinafter “Miyamoto”) or Wang.

VII. ARGUMENT

A. Appellants' Claimed Invention

Appellants' claimed invention provides methods and systems for printing images, comprising: an ink-jet ink including an aqueous liquid vehicle having at least one volatile co-solvent, each volatile co-solvent present having a boiling point at or below about 285°C, wherein the total amount of volatile co-solvent present in the ink-jet ink is from 5 wt% to 50 wt%. The composition also includes acid-functionalized polymer colloid particulates dispersed in the liquid vehicle, the acid-functionalized polymer colloid particulates including surface acid groups, the surface acid groups provided by acid monomers copolymerized with other monomers to form the polymer colloid particulates, and the acid monomers being present at from 1 wt% to 15 wt% of total monomers used to form the polymer colloid particulates. The ink-jet ink also includes polymer-encapsulated pigment colorants dispersed in the liquid vehicle. Additionally, a system for printing images can comprise a thermal ink-jet printhead configured for printing the ink-jet ink, a non-porous substrate configured for receiving the ink-jet ink upon printing with the ink-jet printhead, and a heating element configured for heating the image once it is printed on the non-porous substrate. Further, a method of printing an image with good rub resistance can comprise ink-jetting from a thermal ink-jet printhead the ink-jet ink onto a non-porous substrate to form the image and heating the image once it is printed on the non-porous substrate.

B. The Asserted References

1. The Wang Reference

Wang discloses an aqueous ink-jet ink including a pigment, a polymer latex having at least one halogenated vinyl monomer, a surfactant and a humectant. An ink and receiver combination for a non-absorbing substrate is also provided. See Abstract. Although Wang states that the pigment can be self-dispersible, encapsulated, or stabilized by a dispersant, only pigments stabilized by a separate dispersant are exemplified. See [0023] and Examples [0056-0085]. Additionally, of the 27 types of pigments listed in paragraph [0029], no encapsulated pigments are listed, and of the 287 explicitly identified individual pigments, it does not appear that encapsulated pigments are listed. See [0029]. It is also worthy to note that not a single acid monomer containing latex appears to be exemplified. See Examples [0056-0085]. Thus, the specific combination of a polymer-encapsulated pigment with an acid monomer-containing latex appears nowhere in Wang.

2. The Miyabayashi Reference

Miyabayashi teaches a microencapsulated pigment where pigment particles with an anionic group on the surface are coated with a polymer. Ink-jet inks including the microencapsulated pigment and water, and methods of printing with the ink-jet inks are taught. See Abstract. Miyabayashi also teaches that heating of printed matter may be necessary to accommodate polymers with high transition temperatures. See [0245]. Miyabayashi also does not disclose the use of a thermal ink-jet printer.

3. The Kubota Reference

Kubota teaches an ink composition with colorant, resin emulsion particles, water-soluble organic solvent, water and a reaction solution. The reference further discusses a recording method using the ink composition. See Abstract. Specifically, the recording method comprises the steps of depositing a reaction solution on the recording medium, depositing an ink composition on the recording medium, and washing the recording medium. See [0025-0028]. Kubota does not teach the use of thermal ink-jet architecture.

4. The Kato Reference

Kato teaches compositions and methods for improving optical density and saturation by ink-jet recording. Kato teaches using a liquid composition with cationic micro-particles in combination with a separate anionic ink composition. An image can be formed by applying both the liquid composition and the anionic ink to a recording medium such that the two liquid compositions contact one another on the recording medium. See Abstract.

C. Rejections Under 35 U.S.C. § 112, first paragraph

1. Rejections of Claims 13-14 and 27-28

The Examiner has rejected claims 13-14 and 27-28 as failing to comply with the written description requirement. Specifically, the Examiner has alleged that the presently recited ranges in the claims contain a newly recited endpoint. Further, the Examiner appears to allege that even though the support cited by Appellants contains the endpoint, the endpoint is not disclosed in regard to the instantly claimed non-volatile co-solvent.

Appellants respectfully disagree. Appellants explicitly addressed this issue in Appellants' specification by defining all ranges and sub-ranges for all concentrations. Page 6, lines 1-13. Specifically, the specification defines all ranges to include all sub-ranges (and uses 0.1 wt% as an endpoint). Page 6, lines 3-8. Further, the specification applies the above sub-ranges to ranges reciting one numerical value, stating “[f]or example, a range recited as ‘less than 5 wt%’ should be interpreted to include all values and sub-ranges between 0 wt% and 5 wt%.” Page 6, lines 10-11. Appellants submit that such disclosure defines “less than” to include the specific subrange as currently claimed and note that the definition applies to all concentrations including non-volatile co-solvents. Appellants note that the “[a]n applicant is entitled to be his or her own lexicographer.” MPEP 2111.01(IV) citing *See In re Paulsen*, 30 F.3d 1475, 1480, 31 USPQ2d 1671, 1674 (Fed. Cir. 1994).

As such, Appellants submit that the present specification disclosed the present recited ranges of claims 13-14 and 27-28 in such a way as to reasonably convey to one skilled in the relevant art that the present inventors, at the time the application was filed, had possession of the claimed invention.

In light of the above, Appellants submit that the present claims are fully supported by the specification, and request that the Board overturn the present rejection.

D. Rejections Under 35 U.S.C. § 102(e)

1. Requirements for Anticipation

In order to establish a case of anticipation, the Examiner must show that each and every element is present in a single prior art reference. Specifically, the Appellants wish

to briefly state what is required to sustain such a rejection according to the current case law. It is well settled that "[a] claim is anticipated only if each and every element as set forth in the claims is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil of California*, 814 F.2d 628, 2 U.S.P.Q. 2d 1051, 1053 (Fed. Cir. 1987). In order to establish anticipation under 35 U.S.C. 102, all elements of the claim must be found in a single reference. *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 231 U.S.P.Q. 81, 90 (Fed. Cir. 1986), *cert. denied* 107 S.Ct. 1606 (1987). In particular, as pointed out by the court in *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 220 U.S.P.Q. 303, 313 (Fed. Cir. 1981), *cert denied*, 469 U.S. 851 (1984), "anticipation requires that each and every element of the claimed invention be disclosed in a prior art reference." "The identical invention must be shown in as complete detail as is contained in the...claim." *Richardson v. Suzuki Motor Co.* 9 U.S.P.Q. 2d 1913, 1920 (Fed. Cir. 1989).

With the above background in mind, Appellants contend that the Examiner has not met this burden with respect to any of the claims on appeal. Particularly, Appellants submit that the PTO has failed to show that each and every element of the claimed invention is contained in the Wang reference. Appellants now turn to a discussion of the specific rejection at issue.

2. Rejections of Claims 12-13, 15-16, 23, 25-27, 29-30, 37, and 39-44 by Wang

The Examiner has rejected a portion of claims 12-13, 15-16, 23, 25-27, 29-30, 37, and 39-44 under § 102(e) as being anticipated by Wang. However, Wang does not teach each and every element of the claims. Notably, claims 13, 15-16, 23, and 41-42 each

recite the elements of claims 12 through dependency and claims 27, 29-30, 37, 39-40, and 43-44 each recite the elements of claim 26 through dependency. As such, Appellants submit that the following arguments regarding claims 1 and 26 are applicable to each of the presently rejected claims in each of the subsections as outlined herein.

i. Rejections of Claims 12-13, 15-16, 23, 25-27, 29-30, 37, and 39-40

Independent claims 12 and 26, from which claims 12-17, 23, 25-31, 37, and 39-40 depend, require that the latex includes surface acid groups provided by “acid monomers being present from 1 wt% to 15 wt%” of the latex. The Examiner has alleged that this limitation is taught since Wang discloses that the polymer latex contain less than 50 mol % of a hydrophilic monomer such as methacrylic acid. However, Wang teaches a certain mol % of hydrophilic monomers, as opposed to the present invention which recites 1 wt% to 15 wt% of an acidic monomer containing latex. Specifically, Wang explicitly lists 26 hydrophilic monomers, of which only 4 are acidic. See [0043]. Thus, there appears to be no teaching in Wang that recognizes the difference between acidic monomers and merely hydrophilic monomers, nor is there any teaching in Wang that would lead one skilled in the art to select a specific weight percentage of acidic monomers over other non-acidic monomers, and then use the latex formed therefrom in combination with polymer-encapsulated pigments (which are not discussed in any detail other than to briefly mention their possible use).

Because this specific combination is not taught in the reference, Appellants contend that the rejection relies on inherency rather than a direct teaching for the claimed combination, as such, it is notable that in order to establish inherency, extrinsic evidence

must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Even if a prior art reference is capable of being modified and the modification would anticipate the invention, this is not sufficient to support an anticipation rejection based on inherency. In other words, it appears that the Examiner is arguing that this combination is inherent in the reference, because encapsulated pigments are mentioned in passing, and in a separate place, 4 of 26 hydrophilic monomers that can be used in a polymer are acidic.

As the rejection is particularly relying on this doctrine, Appellants wish to briefly discuss the applicable case law. Specifically, the Federal Circuit Court of Appeals stated “[u]nder the doctrine of inherency, if an element is not expressly disclosed in a prior art reference, the reference will still be deemed to anticipate a subsequent claim if the missing element ‘is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill’” (citations omitted). Rosco, Inc. v. Mirror Lite Co., 304 F.3d 1373, 1380 (Fed. Cir. 2002). The Court further states that “[i]nherent anticipation requires that the missing descriptive material is “necessarily present,” not merely probably or possibly present, in the prior art” (citations omitted). Id. As such, Appellants submit that the appropriate standard in establishing an anticipatory rejection through inherency has been well defined by the courts, and has not been met in the present case.

The fact that Wang explicitly teaches hydrophilic monomers would not necessarily require them to be acidic, nor would one skilled in the art recognize such a limitation. Also, Appellants contend that to combine the elements as proposed in the

rejection would be a modification of the teachings of Wang as Wang does not explicitly teach the use of acidic monomers or provide an example of such, particularly in combination with the other elements described above. Furthermore, Appellants submit that, until the Patent Office establishes each and every element, the burden does not shift to Appellants, as a *prima facie* case has not been established.

Specifically, the Patent Office has not provided the present combination of elements. For example, even though Wang generally discloses different types of pigments, including self-dispersed, encapsulated, and dispersed, can be used in its invention, Wang explicitly lists types of pigments and specific individual pigments in paragraph [0029] of the specification. Notably missing from paragraph [0029] is any reference to an encapsulated pigment. Additionally, Wang provides no examples of inks containing encapsulated pigments. As such, the Examiner is picking and choosing discrete briefly mentioned possibilities and combining them in a manner not specifically taught by Wang. In other words, the combination of an encapsulated pigment and an acid monomer-containing polymer is an element itself, and this specific combination is not taught by the reference. Appellants note that providing the elements is not sufficient to sustain the rejection, but the Patent Office must show the identical invention in as complete detail (per *Richardson v. Suzuki Motor Co.*) as is contained in the claim. Since this combination has not been shown by the reference, Appellants submit that the Patent Office has not met this standard.

The Examiner has responded to the above arguments arguing that the Examiner has not relied upon inherency; rather the Examiner argues that Wang teaches the elements in enough specificity to anticipate the present invention. See Final Office

Action of April 17, 2008, page 4 and Final Office Action of December 12, 2009, page 7. However, such an argument would then necessarily equate the hydrophilic monomers disclosed in Wang as acidic monomers. There is no reason to pick acid functionalized polymers over mere hydrophilic monomers by reading the reference, and there is no teaching that would lead one skilled in the art to select this specific type of pigment and combine it with this specific type of polymer colloid. Appellants submit that such a reading is inconsistent with the disclosure in Wang, as discussed above. There is absolutely no teaching or disclosure in Wang that provides the present combination of elements in as complete detail as contained in the present claims (*Richardson*). In other words, Appellants submit that it is not enough for the rejection to identify elements in a single reference where such elements are merely found in laundry list of components, rather the rejection must show the invention in as complete detail as found in the claims. Stated another way, Appellants freely admit that polymer encapsulated pigments and acid-functionalized polymer colloid particulates existed prior to the filing of the present application. It is the combination of these two elements, in combination with a thermal ink-jet printhead and non-porous media that is claimed here. This combination is nowhere in Wang.

The Examiner and Appellants agree that that the reference need not necessarily exemplify the invention to be anticipatory; however, Appellants submit that the reference still must show the identical invention in as complete detail (per *Richardson v. Suzuki Motor Co.*) as is contained in the claim. Appellants respectfully submit, however, that Wang does not only fail to teach this combination by example, but furthermore, Wang

does not teach or disclose this combination in any other form; i.e., text, table, figure, general description, etc.

Appellants note that the Examiner has also argued that as the disclosed list of hydrophilic monomers is small and that as the acidic monomers are listed first, the Examiner is of the opinion that the present invention is disclosed in sufficient specificity as to anticipate the present claims. Appellants respectfully disagree. Appellants maintain the position that Wang contains no understanding of the present invention, does not teach the present configuration in any way, and that the Examiner is merely picking and choosing the specific elements of Appellants' invention based upon the Appellants' disclosure, not from any teaching or disclosure from the cited art.

Additionally, Appellants note that the Examiner has argued that Wang teaches encapsulated pigments, and even alleges that at least one-third of Wang's pigments are encapsulated. Appellants respectfully disagree. Appellants note that [0023] states:

The pigment used in the present invention can be either self-dispersible such as those described in U.S. Pat. No. 5,630,868, encapsulated as those described in the pending U.S. patent application Ser. No. 09/822,723, filed Mar. 30, 2001, or can be stabilized by a dispersant. The process of preparing inks from pigments commonly involves two steps: (a) a dispersing or milling step to break up the pigment to the primary particle, and (b) dilution step in which the dispersed pigment concentrate is diluted with a carrier and other addenda to a working strength ink. In the milling step, the pigment is usually suspended in a carrier (typically the same carrier as that in the finished ink) along with rigid, inert milling media. Mechanical energy is supplied to this pigment dispersion, and the collisions between the milling media and the pigment cause the pigment to deaggregate into its primary particles. A dispersant or stabilizer, or both, is

commonly added to the pigment dispersion to facilitate the deaggregation of the raw pigment, to maintain colloidal particle stability, and to retard particle reagglomeration and settling.

In light of this passage, Appellants note that the mere use of milling does not equate to encapsulation as alleged by the Examiner. Further, Appellants submit that Wang does not differentiate between any of the 3 types of pigments or provide any disclosure as to the use of one type of pigment over the other. As consistently argued throughout the prosecution, Appellants maintain that Wang does not provide sufficient specificity to anticipate the present invention.

In light of the above, Appellants submit that the Examiner has failed to establish a proper 102 rejection and request that the Board overturn the present rejection.

ii. Rejection of Claims 41-44

The Examiner has rejected claims 41-44 under § 102(e) as being anticipated by Wang. However, Wang does not teach each and every element of the claims. Specifically, Appellants renew the above arguments in subsection 2(i) of the present section with respect to the rejection to claims 41-44. In short, Appellants submit that the Examiner has not established that Wang teaches the present invention in as complete detail as contained in the claims.

Claims 41-44 address density and surface dielectric properties of the acid-functionalized polymer colloid particulates. The Examiner has dismissed these claim elements alleging that they appear typical or would be necessary and inherent. However, such unsubstantiated allegations are not a substitute for prior art or other evidence

necessary to establish anticipation. Appellants submit that these claim elements necessarily limit the scope of the independent claims from which they depend.

As with the rejection of claims 12-13, 15-16, 23, 25-27, 29-30, 37, and 39-40 discussed above, the rejection of claims 41-44 relies on inherency rather than a direct teaching for the claimed combination, as such, it is notable that in order to establish inherency, extrinsic evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Even if a prior art reference is capable of being modified and the modification would anticipate the invention, this is not sufficient to support an anticipation rejection based on inherency. Case law regarding inherency is outlined in the section immediately above and is incorporated herein.

Appellants contend that the claim elements are not inherent in the teachings of Wang. Rather, the claim elements further limit the types of particulates covered by the claim and would necessarily exclude any particulate that does not contain the recited density or surface dielectric constant. Given the relatively large number of potential particles that would otherwise be covered by the independent claims, such a restriction is meaningful and limiting, and would necessarily disclaim most particles not meeting the recited limitations. More importantly, the Examiner has not shown that these claim elements are necessarily present in any of the compositions in Wang.

In light of the above, Appellants submit that the Examiner has not established each and every element of claims 41-44 are present in Wang and request that the Board overturn the present rejection.

E. Rejections Under 35 U.S.C. § 103(a)

1. Requirements for *Prima Facie* obviousness

The Patent and Trademark Office (PTO), through the Examiner, has the burden of establishing a *prima facie* case of obviousness. In re Fine, 837 F.2d 1071, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1998). To satisfy this burden, the PTO must set forth a *prima facie* case of obviousness under any one of the rationales identified by the Supreme Court in KSR International Co, v. Teleflex, Inc. (550 U.S. 398) (2007). Such rationales can be found in MPEP § 2143, and include:

- 1) Combining prior art elements according to known methods to yield predictable results;
- 2) Simple substitution of one known element for another to obtain predictable results;
- 3) Use of known technique to improve similar devices (methods, or products) in the same way;
- 4) Applying known technique to a known device (method, or product) ready for improvement to yield predictable results;
- 5) “Obvious to try” - choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;
- 6) Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if variations are predictable to one of ordinary skill in the art;
- 7) Some teaching, suggestion, or motivation in the prior art [including the references themselves and/or the knowledge generally available to one of ordinary skill in

the art] that would have led one of ordinary skill in the art to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

(TSM Test)

In addition to the rationales set forth above, the obviousness analysis must comply with the statutory scheme as explained by the Supreme Court in *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966), namely, consideration must be given to: (1) the scope and content of the prior art, (2) the differences between the prior art and the claimed invention, (3) the level of ordinary skill in the pertinent art, and (4) additional evidence, which may serve as indicia of non-obviousness.

An excellent summary of how the prior art must be considered to make a case of *prima facie* obviousness is contained in *In re Ehrreich et al.*, 220 U.S.P.Q. 504, 509-511 (CCPA 1979). There the court states that a reference must not be considered in a vacuum, but against the background of the other references of record. It is stated that the question of a § 103 case is what the reference(s) would "collectively suggest" to one of ordinary skill in the art. However, the court specifically cautioned that the Examiner must consider the entirety of the disclosure made by the reference and avoid combining them indiscriminately.

In finding that the "subject matter as a whole" would not have been obvious in *Ehrreich* the court concluded:

"Thus, we are directed to no combination of prior art references which would have rendered the claimed subject matter as a whole obvious to one of ordinary skill in the art at the time the invention was made. The PTO has not shown the existence of all the claimed limitations in the prior art

or any suggestion leading to their combination in the manner claimed by applicants." (underlining added)

It has been widely recognized that virtually every invention is a combination of elements and that most, if not all, of these will be found somewhere in an examination of the prior art. This reasoning lead the court, in *Connell v. Sears, Roebuck & Co.*, 220 U.S.P.Q. 193, 199 (Fed. Cir. 1983) to state:

"...it is common to find elements or features somewhere in the prior art. Moreover, most if not all elements perform their ordained and expected function. The test is whether the claimed invention as a whole, in light of all the teachings of the references in their entirety, would have been obvious to one of ordinary skill in the art at the time the invention was made." (underlining added)

With the above background in mind, Appellants contend that the Examiner has not met this burden with respect to any of the claims on appeal. Particularly, Appellants submit that the PTO has failed to show that each and every element of the claimed invention is contained in the combined references. Appellants now turn to a discussion of the individual rejections at issue, and the references on which they are based.

2. The Rejection of Claims 12-16, 23, 25-30, 37, and 39-44 over Wang in view of evidence given in Hawley's

The Examiner has rejected claim 12-16, 23, 25-30, 37, and 39-44 under § 103(a) as being obvious over Wang in view of evidence given in Hawley's. According to M.P.E.P. § 706.02(j), to render a claim *prima facie* obvious, the asserted prior art reference (or references when combined) must teach or suggest all of the claim

limitations. Appellants submit that Wang does not teach or suggest each and every element of the rejected claims.

i. Rejections of Claims 12-13, 15-16, 23, 25-27, 29-30, 37, and 39-40

Appellants renew the arguments presented in section D of the present brief with respect to the present rejections as the Examiner has reiterated his 102 arguments in the present 103 rejection. Office Action, dated 12/9/09, pages 13-20. Appellants note that the present rejection is a single reference 103 rejection. In other words, Appellants submit that the previous deficiencies outlined in section D have not been cured as the Examiner has not combined Wang with any other reference. Appellants note that Hawley's is only cited as evidentiary support.

Additionally, Appellants submit that the rejection provides no reason why a person skilled in the art would pick and choose a certain pigment with a certain latex containing an acidic monomer from the present combination of references since the references are absolutely devoid of any teachings or disclosure regarding the specific combination as presently claimed. For example, there is no teaching or disclosure in the reference or in the art in general that would lead one skilled in the art to choose a latex with an acidic monomer of 1 wt% to 15 wt% with a polymer-encapsulated pigment.

The rejection fails to provide a reason why a person skilled in the art would make such a combination, which simply fails to support a *prima facie* case of obviousness. Furthermore, Appellants submit that reasons of achieving good rub resistance, good waterfastness, lightfastness, abrasion resistance, good adhesion to non-absorbing substrates, or any other quality disclosed in Wang, could not be a reason to combine a latex monomer with an acidic monomer of 1 wt% to 15 wt% with an encapsulated

pigment since Wang already claims to accomplish this with non-acidic latexes and non-encapsulated pigments.

Appellants also submit that the rejection is based on improper hindsight to reconstruct the instantly claimed invention while using the Appellants' specification as a roadmap. The court has stated that an Applicant's specification cannot be the basis for motivation, i.e., no hindsight reconstruction. Specifically, the court in McNeil-PPC, Inc. v. Perrigo Co., 516 F. Supp. 2d 238, 248 (S.D.N.Y. 2007), affirmed that

the claimed invention as a whole must be compared to the prior art as a whole, Hybritech Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 1383 (Fed. Cir. 1986); Hodosh v. Block Drug Co., 786 F.2d 1136, 1143 n.5 (Fed. Cir. 1986), and courts must avoid aggregating pieces of prior art through hindsight which would not have been combined absent the inventors' insight, KSR, 127 S. Ct. 1727, [WL] at *16.

Accordingly, if a prior art reference is sought to provide a specific element of a claim with the use of hindsight, any rejection based thereon is improper and should be withdrawn. Appellants submit that without the present inventor's insight, the present systems and methods were not known; i.e., the rejection selectively picks and chooses single elements in an attempt to combine them as presently outlined in the instant disclosure without any apparent reason why one skilled in the art would attempt to combine the elements in the manner presently indicated. Furthermore, Appellants submit that there is no reason generally known in the art or provided in the cited references that would direct someone to provide the present combination.

In light of the above, Appellants submit that the Examiner has not established each and every element of claim 12-13, 15-16, 23, 25-27, 29-30, 37, and 39-40 and request that the Board overturn the present rejection.

ii. Rejection of Claims 41-44

The Examiner has rejected claims 41-44 under § 103(a) as being obvious over Wang. According to M.P.E.P. § 706.02(j), to render a claim *prima facie* obvious, the asserted prior art reference (or references when combined) must teach or suggest all of the claim limitations. Appellants submit that Wang does not teach or suggest each and every element of the rejected claims.

Specifically, Appellants renew the above arguments in subsection 2(i) of the present section and section D with respect to the rejection to claims 41-44. In short, Appellants submit that the Examiner has not established a proper 103 rejection.

Additionally, Appellants submit that the present rejection does not teach each and every element as recited in claims 41-44; i.e., density and surface dielectric constants. The rejection relies upon inherency in providing these elements. However, such reliance is misplaced based on the current case law regarding the use of inherency in establishing a proper § 103 rejection. Specifically, in *In re Rijckaert*, the Court concluded that even though the Board had found that a certain condition was known to be optimal, the Court concluded that the condition was not necessarily inherent and overturned the 103 rejections based on such inherency. 9 F.3d 1531, 1533-34 (Fed. Cir. 1993). Specifically, the Court provided several inherency standards applicable to obviousness, including:

“[t]he mere fact that a certain thing may result from a given set of circumstances is not sufficient [to establish inherency.]” *In re Oelrich*, 666 F.2d 578, 581-82, 212

USPQ 323, 326 (CCPA 1981) (citations omitted). “That which may be inherent is not necessarily known. Obviousness cannot be predicated on what is unknown.” *In re Spormann*, 53 C.C.P.A. 1375, 363 F.2d 444, 448, 150 USPQ 449, 452 (CCPA 1966). Such a retrospective view of inherency is not a substitute for some teaching or suggestion supporting an obviousness rejection. See *In re Newell*, 891 F.2d 899, 901, 13 USPQ2d 1248, 1250 (Fed. Cir. 1989).

As applied to the present case, the mere fact that the present particulates may result from the materials found in Wang is not enough to establish inherency.

Additionally, and for argument’s sake, even if the present combination may be inherent from Wang’s description, the present combination of materials was not known. As found in *In re Newell*, the Examiner’s retrospective view in the present case does not establish a *prima facie* case of obviousness as the presently recited elements are not necessarily inherent or qualify as inherent under the current case law regarding obviousness.

Furthermore, Appellants submit that as a *prima facie* case of obviousness has not been established and that the burden has not shifted to Appellants, but remains with the Patent Office until such a *prima facie* case is properly established.

In light of the above, Appellants submit that the Examiner has not established each and every element of claims 41-44 and request that the Board overturn the present rejection.

iii. Rejection of Claims 14 and 28

The Examiner has rejected claims 14 and 28 under § 103(a) as being obvious over Wang. According to M.P.E.P. § 706.02(j), to render a claim *prima facie* obvious, the asserted prior art reference (or references when combined) must teach or suggest all of

the claim limitations. Appellants submit that Wang does not teach or suggest each and every element of the rejected claim.

Specifically, Appellants renew the above arguments in subsection 2(i) of the present section and section D with respect to the rejection to claims 14 and 28. In short, Appellants submit that the Examiner has not established a proper 103 rejection.

Regarding claims 14 and 28, Appellants note that the Examiner has alleged that these specific amounts of non-volatile co-solvents would be obvious since Wang discloses “at least one water miscible cosolvent.” Office Action, dated 12/9/09, page 21. However, Appellants submit that such disclosure does not provide the specific amounts recited in claims 14 and 28. Further, Appellants submit that the Examiner has not provided any reason why one skilled in the art would use these specific amounts. Therefore, Appellants submit that the present elements of claims 14 and 28 have not been shown.

In light of the above, Appellants submit that the Examiner has not established each and every element of claim 14 and 28 and request that the Board overturn the present rejection.

3. The Rejection of Claims 12-16, 18, 23, 25-30, 32, 37, and 39-44 over Wang in view of Miyabayashi

The Examiner has rejected claims 12-16, 18, 23, 25-30, 32, 37, and 39-44 under § 103(a) as being obvious over Wang in view of Miyabayashi. According to M.P.E.P. § 706.02(j), to render a claim *prima facie* obvious, the asserted prior art reference (or references when combined) must teach or suggest all of the claim limitations. Appellants

submit that the combination of Wang in view of Miyabayashi does not teach or suggest each and every element of the rejected claims.

i. Rejections of Claims 12-13, 15-16, 18, 23, 25-27, 29-30, 32, 37, and 39-

40

Appellants renew the arguments presented in section D of the present brief with respect to the present rejections as the Examiner has reiterated his 102 arguments in the present 103 rejection as well as the arguments in subsection 2(i) of the present section. Office Action, dated 12/9/09, pages 26-31. Appellants note that the present rejection provides a secondary reference, Miyabayashi. However, Miyabayashi is only cited as teaching a cross-linker. Office Action, dated 12/9/09, pages 32. In other words, Appellants submit that the previous deficiencies outlined in section D have not been cured.

Specifically, the Examiner has used Miyabayashi to provide the amount of crosslinking monomer recited in claims 18 and 32, which is not disclosed in Wang. However, as previously discussed above, Wang does not provide an ink composition having 1 wt% to 15 wt% of an acidic monomer containing latex in specific combination with a polymer-encapsulated pigment.

In light of the above, Appellants submit that the Examiner has not established each and every element of the present claims and request that the Board overturn the present rejection.

ii. Rejection of Claims 41-44

Appellants renew the arguments presented in section D of the present brief with respect to the present rejections as the Examiner has reiterated his 102 arguments in the

present 103 rejection as well as the arguments in subsection 2(i),(ii) of the present section. Office Action, dated 12/9/09, pages 26-31. Appellants note that the present rejection provides a secondary reference, Miyabayashi. However, Miyabayashi is only cited as teaching a cross-linker. Office Action, dated 12/9/09, pages 32. In other words, Appellants submit that the previous deficiencies outlined in section D have not been cured.

Specifically, the Examiner has used Miyabayashi to provide the amount of crosslinking monomer recited in claims 18 and 32, which is not disclosed in Wang. However, as previously discussed above, Wang does not provide an ink composition having 1 wt% to 15 wt% of an acidic monomer containing latex in specific combination with a polymer-encapsulated pigment as well as the density and surface dielectric constants recited in claims 41-44.

In light of the above, Appellants submit that the Examiner has not established each and every element of the present claims and request that the Board overturn the present rejection.

iii. Rejection of Claims 14 and 28

Appellants renew the arguments presented in section D of the present brief with respect to the present rejections as the Examiner has reiterated his 102 arguments in the present 103 rejection as well as the arguments in subsection 2(i),(iii) of the present section. Office Action, dated 12/9/09, pages 26-31. Appellants note that the present rejection provides a secondary reference, Miyabayashi. However, Miyabayashi is only cited as teaching a cross-linker. Office Action, dated 12/9/09, pages 32. In other words,

Appellants submit that the previous deficiencies outlined in section D have not been cured.

Specifically, the Examiner has used Miyabayashi to provide the amount of crosslinking monomer recited in claims 18 and 32, which is not disclosed in Wang. However, as previously discussed above, Wang does not provide an ink composition having 1 wt% to 15 wt% of an acidic monomer containing latex in specific combination with a polymer-encapsulated pigment as well as the specific amounts of non-volatile co-solvents recited in claims 14 and 28.

In light of the above, Appellants submit that the Examiner has not established each and every element of the present claims and request that the Board overturn the present rejection.

4. The Rejection of Claims 12-15, 18, 23, 25-29, 32, 37, and 39-44 over Kubota in view of *Hawley's* and either Kato or Moffatt

The Examiner has rejected claim 12-15, 18, 23, 25-29, 32, 37, and 39-44 under § 103(a) as being obvious over Kubota in view of various secondary references. According to M.P.E.P. § 706.02(j), to render a claim *prima facie* obvious, the asserted prior art reference (or references when combined) must teach or suggest all of the claim limitations. Appellants submit that the combination of Kubota in view of *Hawley's* and either Kato or Moffatt does not teach or suggest each and every element of the rejected claims.

i. Rejections of Claims 12, 15, 18, 23, 25-26, 29, 32, 37, and 39-40

As discussed above, Kubota teaches an ink composition with colorant, resin emulsion particles, water-soluble organic solvent, water and a reaction solution. The reference further discusses a recording method using the ink composition. See Abstract. Specifically, the recording method comprises the steps of depositing a reaction solution on the recording medium, depositing an ink composition on the recording medium, and washing the recording medium. See [0025-0028]. Kubota does not teach the use of thermal ink-jet architecture.

Kato teaches compositions and methods for improving optical density and saturation by ink-jet recording. Kato teaches using a liquid composition with cationic micro-particles in combination with a separate anionic ink composition. An image can be formed by applying both the liquid composition and the anionic ink to a recording medium such that the two liquid compositions contact one another on the recording medium. See Abstract. It is also notable that Moffatt provides typical teachings as they relate to thermal printing, consistent with much taught in other prior

Appellants note that this rejection focused on the teachings of Kato for ink ejected on stable basis with no satellite dots produced as the basis for the combination. Appellants note that Kato's also discloses difficulties with ink-jetting, including regulating thermal properties of specific heat, thermal expansion coefficient, and thermal conductivity. Col. 26, lines 25-28. As noted in the present Application, configuring a system including thermal ink-jet architecture often requires additional consideration and experimentation of at least selection of ink components. To quote the disclosure,

As a further note, thermal ink-jet systems are quite different in their jetting properties than piezo ink-jet systems. As such, polymer colloid particulates that are effective for use in piezo ink-jet systems are not necessarily effective for use with thermal ink-jet ink systems. However, the converse is not necessarily true. In other words, polymer colloid particulates that work well with thermal ink-jet systems are more likely to work with piezo systems than *vice versa*. Therefore, the selection or manufacture of polymer colloid particulates for use with thermal ink-jet systems often requires more care, as thermal ink-jet systems are less forgiving than piezo ink-jet systems. p. 14, ln. 30 – p. 15 ln. 6.

Such warning regarding the difficulty in working with thermal ink-jet architecture is echoed by Kato's disclosure. Additionally, Appellants note that Kato does not deal with the combination of the ink components in a single fluid, as does the present invention. One of ordinary skill in the art would have no reason to combine the inks of Kubota with the thermal ink-jet architecture briefly noted in Kato. Additionally, Appellants submit that Moffatt does not provide any teachings contrary to Kato or the discussion of thermal printing in the present specification.

The Patent Office has further argued that it would have been obvious to use a thermal ink-jet system since the ink is identical to the Appellants' claimed ink; however, such reasoning is based on circular logic, i.e., hindsight. One skilled in the art would not necessarily conclude that the ink in Kubota would be thermally ink-jettable based on the fact that Appellants have successfully provided a thermal ink-jet ink, since, but for the

present disclosure, one skilled in the art would have no idea that Appellants had provided the ink, or that such ink could be thermally ink-jetted.

The rejection further argued that Kubota does not require that the ink is used in a piezo ink jet system, and thus, one skilled in the art would assume the ink is suitable for thermal ink-jet printing. However, such an argument is flawed. The lack of disclosure regarding thermal printing would not lead one skilled in the art to believe that thermal ink-jet would be implied, but quite the opposite. In other words, one skilled in the art would know how difficult thermal ink-jet printing is and would most likely conclude that such a broad range of compositions as disclosed in Kubota would more likely be piezo ink-jettable. In other words, it is generally understood that thermal ink-jet inks can be jetted by piezo means, but the reverse is not always true.

Additionally, such a combination would not provide a reasonable expectation of success to one skilled in the art, as the selection or manufacture of components for use with thermal ink-jet systems often requires a much greater level of care than with other ink-jet systems.

The Patent Office responsively argues that Kato actually supports the combination. Specifically, the rejection argues that Kato's warning supports that one skilled in the art has the ability to make a thermal printable ink. See Final Office Action April 17, 2008, page 14 and Final Office Action dated December 9, 2009, page 38. Appellants cannot agree with such an interpretation. Kato provides no evidence that one skilled in the art would have the ability to make any ink thermally jettable; rather Appellants maintain the position that Kato serves to warn one skilled in the art that not every ink-jet ink is thermally compatible, or can be made thermally compatible, as

outlined in the present specification. Furthermore, Appellants note the difficulty of thermal printing vs. piezo printing is well-known in the art. As such, Appellants contend that using the ink from Kubota in a thermal printer from Kato would not be obvious to one skilled in the art at the time of the present invention.

Kubota fails to disclose printing of an ink-jet ink including polymer-encapsulated pigment colorant and acid-functionalized polymer colloid particulates dispersed in a liquid vehicle having a volatile co-solvent, where the image is heated after printing. For example, the ink composition referred in the rejection (Ink 4, Table F2) was not subjected to heating. Conversely, the only compositions where heating was utilized (Ink composition A, Color Ink Set A) did not comprise polymer-encapsulated pigments—rather, the pigments and dispersants were combined by mere mixing. See [0241]. These examples in Kubota provide no teaching, therefore, of the combination of elements claimed in the present independent claims 12 and 26. Kato does not remedy this deficiency and therefore the combination does not teach each and every element, and therefore fails to sustain a *prima facie* case of obviousness.

Even though the Examiner argues that one must look at what the reference teaches as a whole, including non-preferred portions, Appellants maintain that the reference as a whole, including non-preferred portions, do not teach the combination of elements as presently claimed. Appellants submit that Kubota discloses thousands of possible combinations and that the Patent Office has provided no reason for one skilled in the art to pick the Appellants' present combination, if possible, absent the Appellants' present disclosure.

In light of the above, Appellants submit that the Examiner has not established each and every element of the present claims and request that the Board overturn the present rejection.

ii. Rejection of Claims 41-44

The Examiner has rejected claims 41-44 under § 103(a) as being obvious over Kubota in view of Hawley's and either Kato or Moffatt. According to M.P.E.P. § 706.02(j), to render a claim *prima facie* obvious, the asserted prior art reference (or references when combined) must teach or suggest all of the claim limitations. Appellants submit that the present combination does not teach or suggest each and every element of the rejected claims.

Specifically, Appellants renew the above arguments in subsection 4(i) of the present section as well as subsection 2(ii) regarding inherency. In short, Appellants submit that the Examiner has not established a proper 103 rejection.

Additionally, the Examiner has not showed the elements of these dependent claims in any reference; i.e., the density and surface dielectric constants. As previously discussed, the cited characteristics are not inherent to the particulates but serve to limit that particulates covered by the independent claims. Absent inherency or any disclosure regarding the elements of density and surface dielectric constants, Appellants submit that the Patent Office has not provided a combination of references that teach each and every element of these claims.

In light of the above, Appellants submit that the Examiner has not established each and every element of the present claims and request that the Board overturn the present rejection.

iii. Rejection of Claims 13-14 and 27-28

The Examiner has rejected claims 13-14 and 27-28 under § 103(a) as being obvious over Kubota in view of Hawley's and either Kato or Moffatt. According to M.P.E.P. § 706.02(j), to render a claim *prima facie* obvious, the asserted prior art reference (or references when combined) must teach or suggest all of the claim limitations. Appellants submit that the present combination does not teach or suggest each and every element of the rejected claims.

Specifically, Appellants renew the above arguments in subsection 4(i) of the present section. In short, Appellants submit that the Examiner has not established a proper 103 rejection.

Additionally, the Examiner has not showed the elements of these dependent claims in any reference; i.e., the specific amounts of non-volatile co-solvents. Appellants note that the Examiner has alleged that these specific amounts of non-volatile co-solvents would be obvious since Kubota discloses the use of non-volatile co-solvents. However, Appellants submit that such disclosure does not provide the specific amounts recited in claims 13-14 and 27-28. Further, Appellants submit that the Examiner has not provided any reason why one skilled in the art would use these specific amounts. Therefore, Appellants submit that the present elements of claims 13-14 and 27-28 have not been disclosed.

In light of the above, Appellants submit that the Examiner has not established each and every element of the present claims and request that the Board overturn the present rejection.

5. The Rejection of Claims 12-15, 18, 23, 25-29, 32, 37, and 39-44 over Kubota in view of *Hawley's* and either Kato and Moffatt and further in view of Miyamoto or Wang

The Examiner has rejected claims 12-15, 18, 23, 25-29, 32, 37, and 39-44 under § 103(a) as being obvious over Kubota in view of *Hawley's* and either Kato and Moffatt and further in view of Miyamoto or Wang. According to M.P.E.P. § 706.02(j), to render a claim *prima facie* obvious, the asserted prior art reference (or references when combined) must teach or suggest all of the claim limitations. Appellants submit that the combination of Kubota in view of *Hawley's* and either Kato and Moffatt and further in view of Miyamoto or Wang does not teach or suggest each and every element of the rejected claims.

i. Rejections of Claims 12-13, 15, 18, 23, 25-27, 29, 32, 37, and 39-40

Appellants renew the arguments presented in subsection 2 and 4 of the present brief with respect to the Kubota, *Hawley's*, Kato, Moffatt, and Wang references cited in the present rejection. Appellants note that the present rejection also cites to Miyamoto. However, Miyamoto is only cited as teaching a silicone or fluorine surfactant. Office Action, dated December 9, 2009, pages 42. In other words, Appellants submit that the previous deficiencies outlined in the previous subsections have not been cured. Therefore, Appellants submit that the present combination does not establish a *prima facie* case of obviousness for the reasons listed above.

In light of the above, Appellants submit that the Examiner has not established each and every element of the present claims and request that the Board overturn the present rejection.

ii. Rejections of Claims 14 and 28

Appellants renew the arguments presented in subsection 2 and 4 of the present brief with respect to the Kubota, *Hawley's*, Kato, Moffatt, and Wang references cited in the present rejection. Appellants note that the present rejection also cites to Miyamoto. However, Miyamoto is only cited as teaching a silicone or fluorine surfactant. Office Action, dated December 9, 2009, pages 42. In other words, Appellants submit that the previous deficiencies outlined in the previous subsections have not been cured. Therefore, Appellants submit that the present combination does not establish a *prima facie* case of obviousness for the reasons listed above. Additionally, Appellants maintain the present combination of references does not teach the specific amounts of non-volatile co-solvents as recited in claims 14 and 28.

In light of the above, Appellants submit that the Examiner has not established each and every element of the present claims and request that the Board overturn the present rejection.

iii. Rejections of Claims 41-44

Appellants renew the arguments presented in subsection 2 and 4 of the present brief with respect to the Kubota, *Hawley's*, Kato, Moffatt, and Wang references cited in the present rejection. Appellants note that the present rejection also cites to Miyamoto. However, Miyamoto is only cited as teaching a silicone or fluorine surfactant. Office Action, dated December 9, 2009, pages 42. In other words, Appellants submit that the previous deficiencies outlined in the previous subsections have not been cured. Therefore, Appellants submit that the present combination does not establish a *prima facie* case of obviousness for the reasons listed above. Additionally, Appellants maintain

the present combination of references does not teach the density and surface dielectric constants recited in claims 41-44.

In light of the above, Appellants submit that the Examiner has not established each and every element of the present claims and request that the Board overturn the present rejection.

F. Conclusion

Appellants respectfully submit that the claims on appeal set forth in the Appendix are patentably distinct from the asserted prior art references. Particularly, none of the references or asserted combinations of references would teach one of ordinary skill in the art within the meaning of 35 U.S.C. § 102(e) or 35 U.S.C. § 103(a) to arrive at the presently claimed invention. Appellants contend that none of the cited references, alone or in combination, teach each and every element of the claimed invention, and that a *prima facie* case of anticipation or obviousness has not been properly established.

For at least these reasons, Appellants respectfully request that the Board of Appeals reverse the rejections and remand the case to the Examiner for allowance.

Dated this 17th day of March, 2010

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VIII. CLAIMS APPENDIX

1 – 11. (canceled).

12. (previously presented) A system for printing images, comprising:

a) an ink-jet ink, including:

i) an aqueous liquid vehicle having at least one volatile co-solvent, each volatile co-solvent present having a boiling point at or below about 285°C, wherein the total amount of volatile co-solvent present in the ink-jet ink is from 5 wt% to 50 wt%,

ii) acid-functionalized polymer colloid particulates dispersed in the liquid vehicle, said acid-functionalized polymer colloid particulates including surface acid groups, said surface acid groups provided by acid monomers copolymerized with other monomers to form the polymer colloid particulates, said acid monomers being present at from 1 wt% to 15 wt% of total monomers used to form the polymer colloid particulates, and

iii) polymer-encapsulated pigment colorants dispersed in the liquid vehicle;

b) a thermal ink-jet printhead configured for printing ink-jet ink;

c) a non-porous substrate configured for receiving the ink-jet ink upon printing with the ink-jet printhead; and

d) a heating element configured for heating the image once it is printed on the non-porous substrate.

13. (previously presented) A system as in claim 12, wherein the liquid vehicle further comprises a non-volatile co-solvent in an amount of from 0.1 wt% to 10 wt%.

14. (previously presented) A system as in claim 12, wherein the liquid vehicle further comprises a non-volatile co-solvent in an amount of from 0.1 wt% to 2 wt%.

15. (original) A system as in claim 12, wherein the liquid vehicle is devoid of any non-volatile co-solvents.

16. (original) A system as in claim 12, wherein the liquid vehicle further includes a member selected from the group consisting of C₁ to C₈ aliphatic hydrocarbons, silicone, fluorocarbon surfactants, and combinations thereof.

17. (canceled).

18. (original) A system as in claim 12, wherein the acid-functionalized polymer colloid particulates are provided by multiple monomers copolymerized to form the polymer colloid particulates, said multiple monomers including at least one crosslinking monomer present at from 0.1 wt% to 3 wt% of total monomers used to form the polymer colloid particulates.

19 – 22. (canceled).

23. (original) A system as in claim 12, wherein the non-porous substrate is selected from the group consisting of plastic sheets, plastic films, coated papers, glass, and metal.

24. (canceled).

25. (original) A system as in claim 12, wherein the at least one volatile co-solvent is a humectant.

26. (previously presented) A method of printing an image with good rub resistance, comprising:

a) ink-jetting from a thermal ink-jet printhead an ink-jet ink onto a non-porous substrate to form the image, said ink-jet ink including:

i) an aqueous liquid vehicle having at least one volatile co-solvent, each volatile co-solvent present having a boiling point at or below about 285°C, wherein the total amount of volatile co-solvent present in the ink-jet ink is from 5 wt% to 50 wt%;

ii) acid-functionalized polymer colloid particulates dispersed in the liquid vehicle; said acid-functionalized polymer colloid particulates including surface acid groups, said surface acid groups provided by acid monomers copolymerized with other monomers to form the polymer colloid particulates, said acid monomers being present at from 1 wt% to 15 wt% of total monomers used to form the polymer colloid particulates, and

iii) polymer-encapsulated pigment colorants dispersed in the liquid vehicle; and

b) heating the image once it is printed on the non-porous substrate.

27. (previously presented) A method as in claim 26, wherein the liquid vehicle further comprises a non-volatile co-solvent in an amount of from 0.1 wt% to 10 wt%.

28. (previously presented) A method as in claim 26, wherein the liquid vehicle further comprises a non-volatile co-solvent in an amount of from 0.1 wt% to 2 wt%.

29. (original) A method as in claim 26, wherein the liquid vehicle is devoid of any non-volatile co-solvents.

30. (original) A method as in claim 26, wherein the liquid vehicle further includes a member selected from the group consisting of hydrocarbon surfactants, silicone surfactants, fluorocarbon surfactants, and combinations thereof.

31. (canceled).

32. (original) A method as in claim 26, wherein the acid-functionalized polymer colloid particulates are provided by multiple monomers copolymerized to form the polymer colloid particulates, said multiple monomers including at least one crosslinking

monomer present at from 0.1 wt% to 3 wt% of total monomers used to form the polymer colloid particulates.

33 - 36. (canceled).

37. (original) A method as in claim 26, wherein the non-porous substrate is selected from the group consisting of plastic sheets, plastic films, coated papers, glass, and metal.

38. (canceled).

39. (previously presented) A method as in claim 26, wherein the heating step is carried out at a temperature effective to drive off enough of the volatile co-solvent to improve the image permanence.

40. (original) A method as in claim 26, wherein the at least one volatile co-solvent is a humectant.

41. (previously presented) A system as in claim 12, wherein the acid-functionalized polymer colloid particulates have a density of 0.9 g/cm^3 to 1.1 g/cm^3 .

42. (previously presented) A system as in claim 12, wherein the acid-functionalized polymer colloid particulates have a surface dielectric constant below 2.8.

43. (previously presented) A method as in claim 26, wherein the acid-functionalized polymer colloid particulates have a density of 0.9 g/cm^3 to 1.1 g/cm^3 .

44. (previously presented) A method as in claim 26, wherein the acid-functionalized polymer colloid particulates have a surface dielectric constant below 2.8.

IX. EVIDENCE APPENDIX

None

X. RELATED PROCEEDINGS APPENDIX

None